(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 November 2000 (30.11.2000)

PCT

(10) International Publication Number
WO 00/72199 A2

(51) International Patent Classification[7]: G06F 17/30

(21) International Application Number: PCT/US00/13906

(22) International Filing Date: 18 May 2000 (18.05.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/135,291	21 May 1999 (21.05.1999)	US
09/338,912	23 June 1999 (23.06.1999)	US

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility

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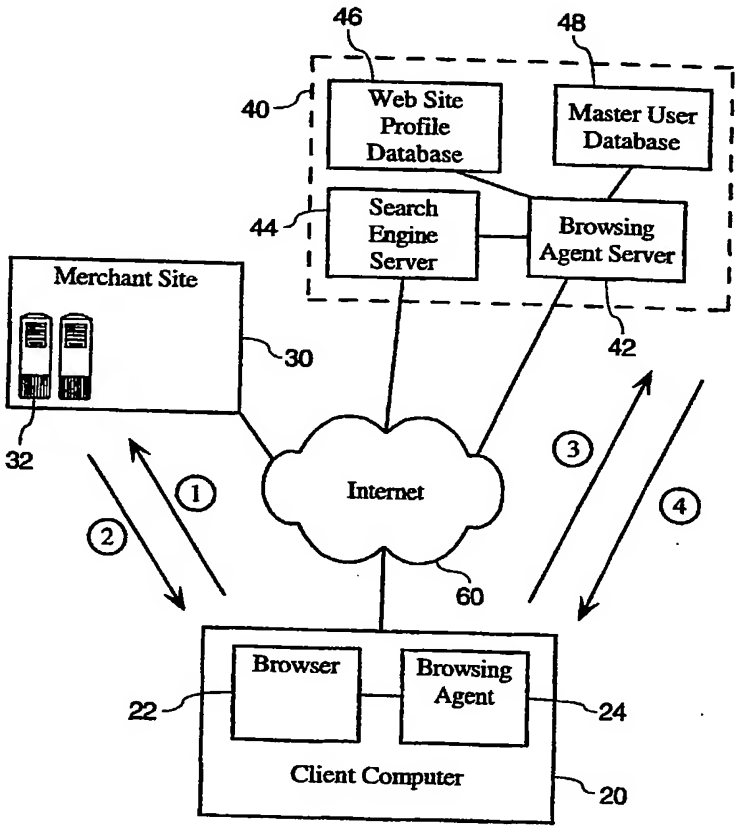
(54) Title: AUTONOMOUS BROWSING AGENT



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WO 00/72199 A2

AUTONOMOUS BROWSING AGENT

FIELD OF THE INVENTION

The present invention relates to computer networks. More specifically, the present invention provides methods and systems for providing an autonomous software agent that assists a user during browsing sessions on a computer network.

BACKGROUND OF THE INVENTION

The Internet is a global network of millions of computers belonging to various commercial and non-profit entities such as corporations, universities, and research organizations. The computer networks of the Internet are connected by gateways that handle data transfer and conversion of messages from a sending network to the protocols used by a receiving network. The Internet's collection of networks and gateways use the TCP/IP protocol. TCP/IP is an acronym for Transport Control Protocol/Interface Program, a software protocol developed by the Department of Defense.

The increasing use of wide area networks such as the Internet has resulted in an explosion in the provision of on-line services. Computer users can access a vast wealth of information and services by utilizing a wide area network to establish a connection with other computers connected to the network.

Typically, the computers connected to a wide area network such as the Internet are identified as either servers or clients. A server is a computer that stores files that are available to other computers connected to the network. A client is a computer connected to the network that accesses the files and other resources provided by a server. To obtain information from a server, a client computer makes a request for a file or information located on the server using a specified protocol.

need a method and system that monitors the actions of the user while he or she is browsing a web site and offers the user assistance and/or more information relating to the currently viewed page. For example, every transaction conducted over the Internet requires the consumer to provide information necessary to complete the transaction. A typical web page presents an interface that the consumer fills out to access more information, for example, or order a product. For instance, a customer may access a particular merchant web site and order a product advertised on that web site. To complete the transaction, the merchant web server presents a web page with an interface requiring certain information from the user, such as name, delivery address, and payment information. Anyone who has encountered such interfaces recognizes that providing the required information is often a tedious process.

Accordingly, a need exists for a method and system that automates the operation of Web page-based interfaces, including, for example, input field data entry and page-based information gathering. Furthermore, since each Web page may include a different interface or otherwise be interacted with in a unique manner, such a method or system must be able to identify the web page to which the user is navigating with his or her browser, and be "aware" of what may be done there and how to accomplish it.

As discussed above, there are numerous resources accessible over the Internet. However, retrieving desired information on the Internet requires knowledge of an associated URL. Accordingly, if, for example, a consumer wishes to obtain information about or order a particular company's product on the World Wide Web, she must know the URL (data location) corresponding to that company's web site. As a user navigates through a particular web site, however, she may wish to receive more information about a particular subject. For example, a consumer may wish to find out the price at which other merchants are offering a particular book. In this instance, the user must manually browse other merchant sites. When a specific URL or data location is not known, search engines are a way of locating desired URLs pointing to desired information. Typically, a user enters key words or search terms into a search

actions the user takes when browsing a computer network. A click stream consists of a series of web pages, network addresses, any data the user inputs into a form and/or any thing the user clicks on.

Preferred embodiments of the invention allow the user to configure the browsing agent to act or appear to the user only under certain specified condition. Under this embodiment, the method comprises (a) receiving a browsing agent configuration from a user; (b) monitoring, at said client computer, a click stream; (c) sending click stream data and said agent configuration to said browsing agent server, said click stream data being derived from said click stream; (d) receiving control data corresponding to said click stream data and said agent configuration: and (e) offering a command option to said user, said command option based on said control data.

In addition, the present invention also provides methods and systems for supporting the browsing agent resident on the user's computer. These methods generally comprise (a) receiving click stream data from a browsing agent resident on said client computer; (b) determining whether control data exists for said click stream data; (c) transmitting said control data to said browsing agent, if such control data exist. An alternative method comprises (a) receiving click stream data and a browsing agent configuration from a browsing agent resident on said client computer; (b) determining whether control data exist for said click stream data; (c) transmitting said control data to said browsing agent, if such control data exist and said control data is consistent with said browsing agent configuration.

Furthermore, one embodiment of the present invention provides a method and system for automating the operation of page-based interfaces on a computer network. As the user navigates to various Web pages with his or her browser, the present invention automatically (*i.e.*, with no user-issued command) senses to which page the user has navigated. The present invention then accesses a database that applies a set of rules that match patterns from which the user's intentions may be inferred. The browsing agent server will then respond with a set of possible actions (command options) that the user may select to assist in managing the page.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1A illustrates a preferred embodiment of the present invention. The present invention generally involves at least one client computer 20, at least one merchant or web site 30, and browsing agent site 40, all of which are connected to the Internet 60. Of course, one skilled in the art will recognize that the present invention can be applied across to any computer network. In addition, Figure 1B illustrates a variation of the information flow depicted in Figure 1A. The system illustrated in Figure 1B shows the communication paths going through browsing agent server as a proxy server. Those skilled in the art will know that either of the implementations illustrated in Figures 1A and 1B is possible and that the architectures represented therein offer different engineering trade-offs.

As is conventional, merchant or web site 30 is supported by web or Internet servers 32, which receive requests submitted by users and transmit files and other documents in return. As Figure 1A shows, in one preferred embodiment, servers 32 are connected to the Internet 60.

As Figure 1A shows, one embodiment of the present invention works in conjunction with a conventional computer having an Internet browser 22 and a connection to the Internet. The user's computer 20 can be any conventional personal computer known in the art. In preferred form, user computer 20 includes at least one processor, a data storage system (including volatile and non-volatile media), a keyboard, a display, at least one input device and at least one output device. In one preferred embodiment, the user's computer is connected to the Internet via a modem dial-up connection or through a network line. Such communication could also be wireless.

According to the invention, client computer 20 also includes browsing agent 24. Browsing agent 24 may be implemented in hardware, software or a combination of both. In preferred form, browsing agent 24 is a software application executing on client computer 20 in a conventional manner. As is more fully described below, browsing agent 24 works in connection with browser 22. More specifically, browsing

In one preferred embodiment, the user's session begins by logging into an account with browsing agent site 40. In this embodiment, browsing agent 24 appears in the foreground during login. More specifically, a user using client computer 20 accesses an account stored on master user database 48 operably connected to servers 42 of browsing agent site 40. According to one embodiment, the user's account includes a user name, and a password or an encrypted representation thereof.

Servers 42 authenticate users in a conventional manner. In one embodiment, server 42 prompts the user for a user name and a password to authenticate the user. Numerous authentication protocols are known in the art. The actual authentication protocol used is not critical to the invention. In one preferred embodiment, the records corresponding to each account contain the user name and a salted one-way hash of the user's password. Therefore, each user is authenticated by hashing the inputted password with the "salt" and comparing the result to the hash value stored in the user's record. If there is a match, the user is deemed to be authentic.

According to one embodiment of the present invention, the user has provided browsing agent site 40 with certain standard information normally required for completing transactions. Such user information may include, but is not limited to, name, address, delivery address, and payment information, such as credit card, type, number and expiration date. As discussed more fully below, this information can be stored locally by browsing agent 24 or remotely in an account on browsing agent server 42 or master user database 48. Furthermore, other user information may be stored. For example, such information can include personal preferences, medical history, financial information, demographic information, transaction history, scholastic information, business information, as well as any other information that the present invention could use to assist the user in interacting with the Internet or other computer network.

Upon proper authentication of the user, browsing agent 24 drops into the background, allowing the main browser window to be displayed. The user then accesses web site 30 and requests a page or document, as is conventional. (*See*

different. Browsing agent 24 stores the address of the newly specified page in its variable memory location, and sends it to browsing agent server 42, which compares it to all addresses stored in profile database 46. As discussed above, if browsing agent server 42 determines that the address of the new page matches an address stored in profile database 46, control data associated with the address of the page are obtained from profile database 46 and delivered via the Internet 60 to browsing agent 24. If no matching address is found, browsing agent 24 merely continues its repeating cycle until the user specifies a new page. (See Figure 2, step 104.)

In one embodiment, the control data associated with the Destination Web Page provide browsing agent 24 with the data to be inserted into the data fields contained within an interface of the currently viewed page. Browsing agent 24, now equipped with programming instructions relevant to the currently viewed page, comes into the foreground on the user's video display. (See Figure 2, step 106.) Interface controls relevant to the programming instructions are made visible to the user by browsing agent 24. Using the Interface Controls, the user may command browsing agent 24 to insert the data into the data fields appearing in the interface of the currently viewed page. (See Figure 2, steps 108 and 110.) Once the command option is performed, browsing agent 24 then transfers to the background and resumes its monitoring of the click stream on browser 22.

For example, and in one preferred embodiment, the present invention has application to a web site corresponding to an on-line music store. As is conventional, the user navigates through the on-line music store and selects various compact discs and audio tapes he wishes to purchase. As discussed above, as the user navigates among the various web pages provided by the on-line music store web server, browsing agent 24 transmits corresponding addresses or other click stream data to browsing agent server 42, which looks for matches in profile database 46. When the user indicates that he is ready to purchase his selections, the on-line music store presents a web page having an interface including certain data fields. These data fields may include the user's name, address, telephone number, credit card number

One aspect of the present invention involves creating rules for modeling the user's intentions and generating profiles that model web sites. A web-site of a particular on-line store, for example, often includes more than one interface or form. Accordingly, one embodiment of the present invention groups the interface profiles according to the domain name of the particular web site. For example, a group of interface profiles corresponding to an on-line store web site having four interfaces may be named on-linestore.com.profile1, on-linestore.com.profile2, *etc.* These interface profiles are stored in web site profile database 46 in association with the corresponding computer network address or URL. In preferred embodiments, the interface profiles are associated with a particular sub-string of the computer network address or URL that contains the particular interface, since often the current URL or address includes session-specific information.

As discussed above, in one preferred embodiment of the present invention, the databases used in the present invention are arranged into a series of records. The records store information of two kinds: merchant or web site records including the interface profiles corresponding to the merchant or web site and user records. The merchant or web site records model the merchant's web site. The purpose of the merchant model is to map the data from the user's data from standard canonical form (schema) into the specific form required by the merchant. Those skilled in the art know that the precise form of the merchant model can take a variety of forms. In the preferred embodiment, the merchant model is constructed as a stored program written in a scripting language such as JavaScript. But it can take also the form of a simple table of name-value mappings. Those skilled in the art will recognize the performance advantages of representing the mapping process directly as a program.

Other preferred embodiments of the present invention are illustrated in Figures 3 and 4. As Figure 3 illustrates, a second preferred embodiment allows the user to configure browsing agent 24 before a session begins. (*See* Figure 3, step 202.) The second preferred embodiment also features the ability to perform searches in the

including certain data fields. These data fields may include the user's name, address, telephone number, credit card number and expiration date. According to the invention, the address corresponding to this web page is communicated to browsing agent server 42 which finds a corresponding entry in profile database 46. Browsing agent server 42 then accesses master user database 48 and formats the data corresponding to the user's account as discussed above in the description of the first preferred embodiment. In addition, browsing agent 24 also scans the currently viewed page for the fields describing the compact discs or other products the user intends to purchase. It then transmits this product information (click stream data) to browsing agent server 42. In preferred form, browsing agent transmits the Uniform Product Code ("UPC") number corresponding to each product to browsing agent server 42.

With this click stream data, browsing agent server 42 accesses search engine server 44 (See Figure 1A.) Using the UPC number, product name or any other relevant information, search engine server 44 searches other web sites connected to the Internet 60 that may contain information about the product(s) the user intends to purchase. In one preferred embodiment, for example, browsing agent 24 allows the user to configure the agent to help the user to engage in comparison shopping or to obtain information related to the product, such as consumer report or manufacture's information. If search engine server finds information that is consistent with the agent configuration, it transmits it to browsing agent 24. Otherwise, browsing agent 24 monitors subsequent user activity. (See Figure 3, steps 204 and 206.)

If related information is received from browsing agent server 42, the command option to display such information is offered to the user. (See Figure 3, step 208.) If the user selects the command option, the results of the search are displayed. As discussed above, browsing agent 24 appears in the foreground and displays, for example, a list of other web sites and the offering price for the searched product. In addition, browsing agent 24 may offer consumer report information, if such information is available and found. As one skilled in the art can imagine, search

The foregoing description illustrates the principles of the present invention and provides examples of its implementation. For example, although the preferred embodiment is described as working in conjunction with an Internet browser, the present invention may be used in connection with any suitable software application for accessing files throughout a computer network. Accordingly, the description is not intended to limit the scope of the claims to the exact embodiments shown and described.

(c) sending click stream data and said agent configuration to said browsing agent server, said click stream data being derived from said click stream;

(d) receiving control data corresponding to said click stream data and said agent configuration; and

(e) offering a command option to said user, said command option based on said control data.

4. The method of claim 3 further comprising the step of

(f) performing said command option, if said user selects it.

5. The method of claims 3 further comprising the step of

(f) repeating steps (a)-(e) a desired number of times.

6. The method of claim 4 further comprising the step of

(g) repeating steps (a)-(f) a desired number of times.

7. A method for enhancing access to information on a computer network, said computer network carrying and routing data between computers connected thereto, said computers including at least one client computer associated with one or more users, at least one server associated with a provider of goods, services or information, and at least one browsing agent server associated with an autonomous browsing agent, said method comprising the steps of

(a) receiving a browsing agent configuration from a user;

(b) monitoring, at said client computer, a click stream;

(c) sending click stream data to said browsing agent server, said click stream data derived from said click stream;

(d) receiving control data corresponding to said click stream data;

(e) offering a command option based on said control data to said user, if said command option is consistent with said agent configuration.

and at least one browsing agent server associated with an autonomous browsing agent, said method comprising the steps of

(a) receiving click stream data from a browsing agent resident on said client computer;

(b) determining whether control data exists for said click stream data;

(c) transmitting said control data to said browsing agent, if such control data exist.

15. A method for enhancing access to information on a computer network, said computer network carrying and routing data between computers connected thereto, said computers including at least one client computer associated with one or more users, at least one server associated with a provider of goods, services or information, and at least one browsing agent server associated with an autonomous browsing agent, said method comprising the steps of

(a) receiving click stream data and a browsing agent configuration from a browsing agent resident on said client computer;

(b) determining whether control data exist for said click stream data;

(c) transmitting said control data to said browsing agent, if such control data exist and said control data is consistent with said browsing agent configuration.

16. An apparatus for automating the operation of page-based interfaces on a computer network comprising

a database having a list of click streams, said database storing interface profiles for corresponding ones of said click streams;

a processor coupled to said database, said processor also being coupled to receive a click stream, said processor accessing said database according to said click stream to retrieve the interface profile corresponding to said click stream, said processor further being coupled to transmit said interface profile.

(h) transmitting to said client computer said user information formatted according to the interface profile associated with the sub-string that matches said computer network address.

21. The method of claim 19 further comprising the steps of

(e) receiving a computer network address from a browsing agent resident on said client computer;

(f) searching said database for sub-strings stored in step (c) that are included in said computer network address received in step (e);

(g) transmitting to said client computer said interface profile associated with the sub-string that matches said computer network address.

22. A method for automating the operation of page-based interfaces on a computer network, said computer network carrying and routing data between computers connected thereto, said computers including at least one client computer associated with one or more users, at least one server associated with a provider of goods, services or information, and at least one browsing agent server associated with an autonomous browsing agent, said method comprising the steps of

(a) sensing the computer network address of the currently viewed page, said page including an interface;

(b) transmitting said computer network address to a database, said database including computer network addresses or sub-strings thereof and interface profiles for corresponding ones of said computer network addresses, said database further storing user information corresponding to said users;

(c) receiving from said database said user information formatted according to the interface profile associated with the computer network address or sub-string that matches said transmitted computer network address.

means for operating on said interface of said page according to said user information and said interface profile.

28. The apparatus of claim 27 wherein said means for sensing further includes means for sensing the content of the currently viewed page.

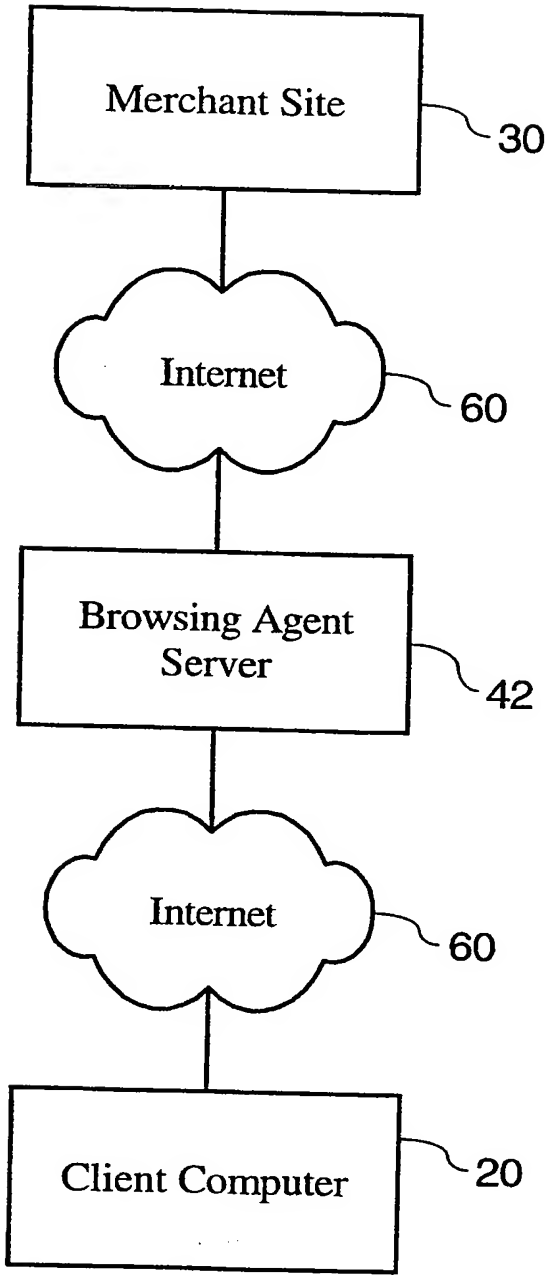

FIG. 1B

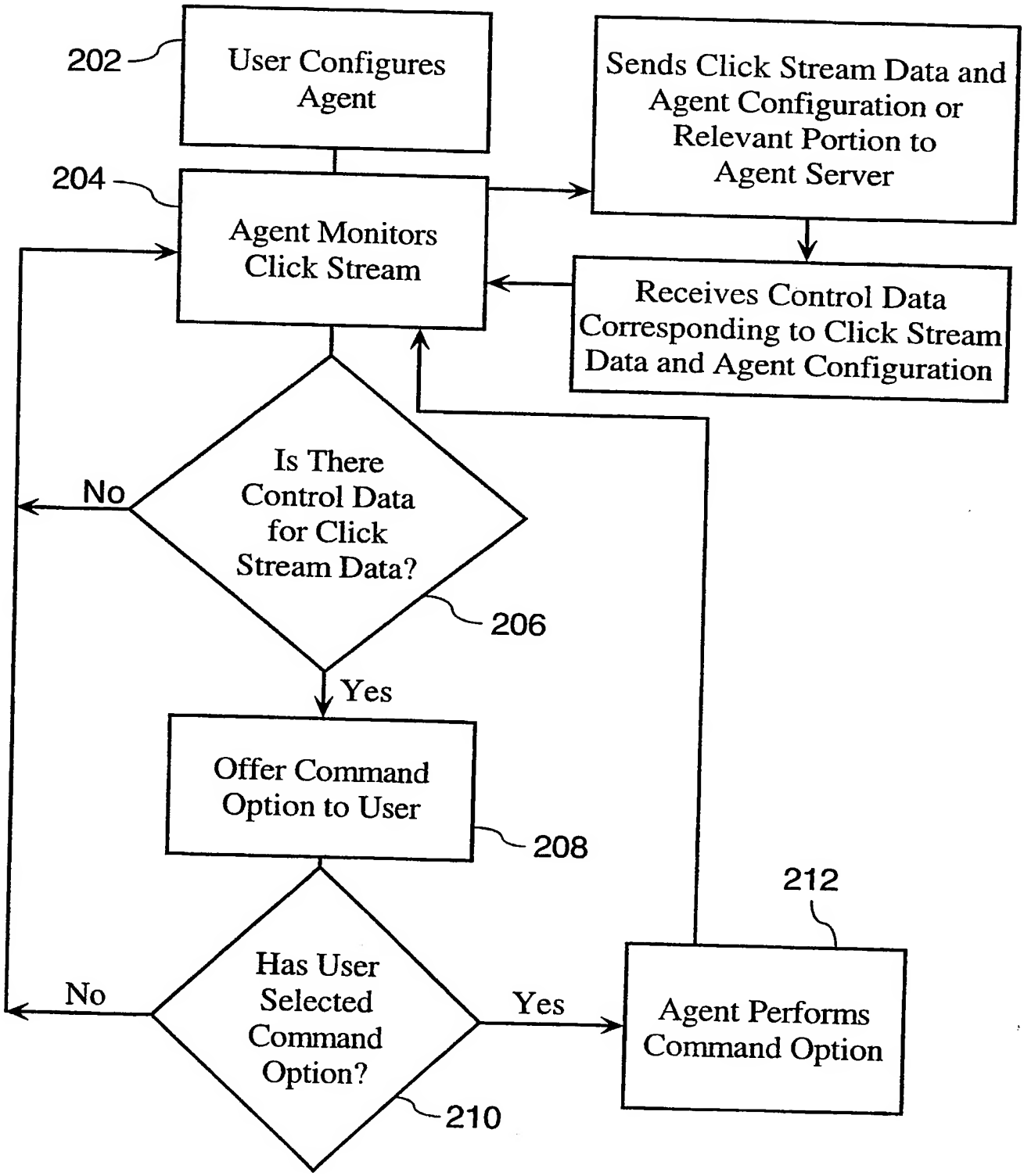

FIG. 3

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 November 2000 (30.11.2000)

PCT

(10) International Publication Number
WO 00/072199 A3

(51) International Patent Classification[7]: G06F 17/30

(21) International Application Number: PCT/US00/13906

(22) International Filing Date: 18 May 2000 (18.05.2000)

(25) Filing Language: English

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(74) Agent: **MEYER, Virginia, H.**; Meyer Intellectual Property Law, Suite 275, 475 Gate Five Road, Sausalito, CA 94965 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR (utility model), KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

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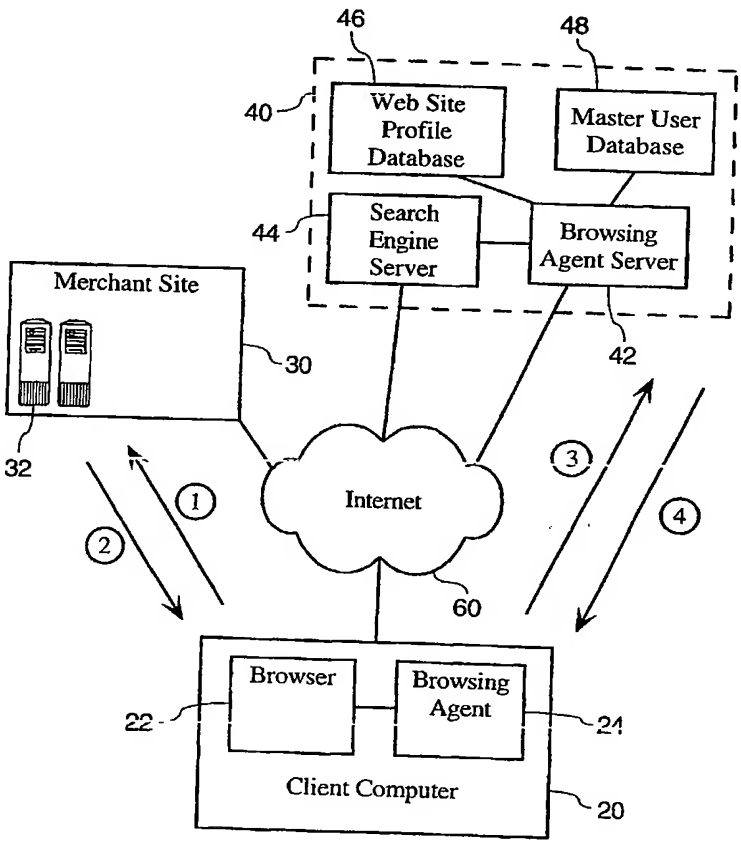
(54) Title: AUTONOMOUS BROWSING AGENT



(57) Abstract: Methods and systems for implementing and supporting an autonomous software agent that assists the user during a web browsing or navigation session on a computer network are disclosed. The computer network includes at least one client computer associated with one or more users, at least one server associated with a provider of goods, services or information, and at least one browsing agent server associated with an autonomous browsing agent. The method of the present invention comprises (a) monitoring, at the client computer, a click stream; (b) transmitting click stream data to the browsing agent server, the click stream data being derived from the click stream; (c) receiving control data corresponding to the click stream data; (d) offering a command option to the user, the command option based on the control data; and (e) performing the command option, if the user selects it.

WO 00/072199 A3

INTERNATIONAL SEARCH REPORT

International cation No
PCT/US 00/13906

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F17/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JACZYNSKI M ET AL: "WWW Assisted Browsing by Reusing Past Navigations of a Group of Users" ADVANCES IN CASE-BASED REASONING, SPRINGER VERLAG, DE, September 1998 (1998-09), pages 160-171, XP002140921 abstract page 162, last paragraph -page 164, line 25; figures 2,3 page 167, line 7-15	1-10,14, 15
Y		11-13
A		18-28

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 September 2003	01/10/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Ruiz Sanchez, J

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 00/13906

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